

Diabetic Foot: its grades and mode of presentation at a tertiary care hospital of Peshawar, Khyber Pakhtunkhwa, Pakistan

Jamil Ahmad, Akash Kumar, Zubair Ahmad Khan, Sarah Rahim, Muhammad Mohsin, Abbas Khan

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Author Information

From: Department of Surgery,
Rehman Medical institute,
Peshawar, Khyber
Pakhtunkhwa, Pakistan

Professor Dr. Jamil Ahmad
Consultant General Surgeon
& HOD
(Corresponding Author)
Email:
jamil.ahmad@rmi.edu.pk

Dr. Akash Kumar
House Officer

Professor Dr. Zubair Ahmad
Khan
Consultant General Surgeon

Dr. Sarah Rahim
House Officer

Dr. Muhammad Mohsin
Medical Officer

Dr. Abbas Khan
House Officer

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ABSTRACT

Introduction: Diabetic foot is defined as the foot of diabetic patients with ulceration, infection, and/or destruction of the deep tissues, associated with neurological abnormalities and various degrees of peripheral vascular disease in the lower limb. Foot ulcers are the principal cause of severe complications and hospitalization among patients with diabetes, substantially increasing the costs of this disease.

Objectives: To describe the presentation, distribute the diabetic foot lesions according to Wagner's classification, and determine the outcome of diabetic foot ulceration in a tertiary care hospital of Peshawar, Pakistan.

Materials & Methods: This study was conducted in the Surgery department of Rehman Medical Institute Peshawar. Thirty nine (39) patients with diabetic foot disease presenting from Jan 2018 to Dec 2019 were included in the study. The patients were evaluated and managed by classifying their disease according to Wagner's classification for diabetic foot disease. Statistical analysis was done by using SPSS version 26 for descriptive statistics.

Results: The most common age of presentation with diabetic foot lesion was between 41-70 years; out of 39 patients, 28 (71.8%) were males and 11 (28.2%) were females. Their mode of presentation was as follows- 22 cases (56.4%) with Ulcer, 9 cases (23.1%) with Cellulitis, 7 cases (17.9%) with Gangrene, and 1 case (2.6%) with Abscess. The most common grade of presentation were grades 3 and 4 Wagner's lesion followed by Grade 1, and Grade 2. Debridement was the most common treatment modality (56.2%), followed by Amputation (41%).

Conclusion: Foot ulceration in diabetic patients is a resource-consuming, disabling morbidity that often is the first step towards lower extremity amputation. Diabetic foot lesions can be easily graded according to the Wagner classification and helps in correlating appropriate treatment to the grade of the lesion for a better outcome.

Keywords: Diabetes Mellitus; Diabetic Foot; Peripheral Vascular Diseases; Neuropathy.

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INTRODUCTION

According to the World Health Organization and the International Working Group on Diabetic Foot, diabetic foot is defined as the foot of diabetic patients with ulceration, infection, and/or destruction of the deep tissues, associated with neurological abnormalities and various degrees of peripheral vascular disease in the lower limb.¹

Worldwide 10-25% of all diabetics develop some form of foot problems during their course of illness ranging from simple calluses to major abscesses out of which Foot Ulcers remain one of the most distressing complications of a diabetic patient.^{2,3}

Foot Ulcers are the principal cause of severe complications and hospitalization among patients with diabetes, substantially increasing the costs of this disease.⁴ In the United States, the annual cost of foot ulcers is estimated at US\$11 billion.^{4,5}

Outcomes of foot ulcers depend on the stage of the disease that patients present with. Common risk factors for amputation following ulceration include the presence of peripheral vascular disease, the severity of neuropathy, structural foot deformity, and concomitant infection.⁶⁻⁸

Lower Extremity Amputation (LEA) occurs 10-30 times more frequently in diabetic patients compared to non-diabetic patients and 70% of lower-limb amputations occur in people with diabetes, 85% of which follow foot ulceration.^{6,9,10}

The prevalence of LEA, however, varies greatly across the world.^{11,12} In the USA a lower extremity amputation occurs at a rate of 8.6/1000 (0.86%) diabetic subjects per year. However, in Pakistan despite a comparable prevalence of diabetic foot ulceration, the amputation rate was 21% but has also been reported to be as high as 48%.^{8,7,13}

The purpose of this study was to define the presentation, to analyze and distribute the diabetic foot lesions according to Wagner's classification, as well as determining the outcome of diabetic foot ulceration in a tertiary care hospital of Peshawar Pakistan.

MATERIALS & METHODS

This study was conducted in the Department of Surgery at Rehman Medical Institute, Peshawar. Thirty-Nine (39) patients with diabetic foot disease presenting from Jan 2018 to Dec 2019 were included in the study.

Data were collected by taking a detailed history and clinical examination of the foot; its wound or ulcer was recorded. Data of patients with a chronic diabetic foot or previous amputation were

collected from their previous records. Age, sex, socioeconomic status, duration of diabetes, Wagner's Classification, findings of clinical examination, investigations including blood glucose profile, renal functions, swabs from wound / ulcer, biopsy of the specimen, X-ray of the foot, and treatment carried out were recorded. The patients were evaluated and managed by classifying their disease according to Wagner's classification for diabetic foot disease (Table 1).

Table 1: Standard Treatment for Diabetic Foot according to Wagner's Classification

Grades	Meggitt & Wagner classification	Treatment
Grade-0	Foot at Risk	Prevention
Grade-1	Localized, Superficial Ulcer	Antibiotics & glycemic control
Grade-2	Deep Ulcer to the Tendon, Bone, Ligament, or Joint	Debridement, Antibiotics & Glycemic control
Grade-3	Deep Abscess, Osteomyelitis	Debridement, some form of Amputation
Grade-4	Gangrene of Toes and Forefoot	Wide debridement and amputation
Grade-5	Gangrene of Entire Foot	Below knee amputation

Statistical analysis was done by using SPSS version 26. Descriptive analyses of age, sex, grade at presentation, and surgical procedure were performed.

RESULTS

The most common age of presentation with diabetic foot lesion was between 41-70 years; 28 (71.8%) patients were males and 11 (28.2%) females. The mode of presentation was Ulcer (22 cases, 56.4%), Cellulitis (09 cases, 23.1%), Gangrene (07 cases, 17.9%) and Abscess (01 case, 2.6%). The most common site of presentation was Right foot in 16 patients (41%) followed by Toe 09 (23.1), Left Foot 07 (17.9%), Right leg 05 (12.8%), and left leg 02 (5.1%) as shown in Table 2.

Table 2: Demographic Profile of Patients (n=39).

Variables	Frequency (N)	Percent (%)
Age Group (years)		
20-30	02	05.1
31-40	01	2.6
41-50	09	23.1
51-60	10	25.6
61-70	12	30.8
71-80	04	10.3
81-90	01	02.6
Gender		
Male	28	71.8
Female	11	28.2
Mode-of-Presentation		
Gangrene	07	17.9
Ulcer	22	56.4
Cellulitis	09	23.1
Abscess	01	02.6
Site-Of-Lesion		
Toe	09	23.1
Right Foot	16	41.0
Left Foot	07	17.9
Right Leg	05	12.8
Left Leg	02	05.1

Grades of presentations based on Wagner's Classification of Diabetic foot are shown in Table 3. The most common grade of presentation according to Wagner's Classification were grades 3 and 4 Wagner's lesion followed by Grade 1, Grade 2. The ulcer was one of the most common presentations of Diabetic Foot (22 cases, 56.4%).

Table 3: Grade of Presentation

Grade	Number of Patients	Percent
Grade 0	04	10.3
Grade 1	09	23.1
Grade 2	04	10.3
Grade 3	12	30.8
Grade 4	10	25.6
Grade 5	0	0
Total	39	100.0

Debridement was the most common treatment modality among various treatment modalities. In this study of 39 cases, 22 (56.4%) patient required local debridement after initial surgery, and 16 (41%) who were presented with diabetic foot and undergone amputation. Only one patient (02.6%) had Incision and Drainage (Table 4).

Table 4: Treatment Provided (n=39).

Procedure	Frequency	Percent
Debridement	22	56.2
Amputation	16	41.0
Incision Drainage	01	02.6
Total	39	100.0

DISCUSSION

Diabetic foot is the most common complication in which diabetic patients suffer.¹⁴ It puts a huge burden on the health care system worldwide. Patients with diabetes are at risk of developing multiple complications making their feet vulnerable to damage. Foot infection and the subsequent amputation of a lower extremity are the most common cause of hospitalization among

diabetic patients. Wagner's classification of the diabetic foot provided an objective grading and elucidation of standard treatment for diabetic foot disease.

Diabetic foot disease is more common in the older age group as compared to younger ones. In our study, the most commonly affected age group was 41-70 years with a mean age of 56.85 years. Similarly, a study was done in Rawalpindi, Islamabad And tertiary care hospitals of Peshawar and Abbottabad also suggested that the older age group (41-60 years) is more frequently affected with a mean age of 53.7 years.^{15,16}

In this study, Diabetic foot disease was more common in males as compared to females with a percentage of 71.8%. our results agreed with the previously published studies, Local and international that also showed a male predominance.^{17,18,13}

Our results confirmed that most of the ulcers were in the forefoot (both right & left) 59.0%. Similar results were shown in a study by Aamir AH et al at Lady Reading Hospital, Peshawar⁷ and Lipsky BA et al in the USA.¹⁹

We use Wagner's classification system in our hospital setup for Diabetic foot Ulcer classification. In our study 4(10.3%) patients with the foot at risk were in grade-0. Nine (23.1%) patients with superficial ulceration and erythema, four (10.3%) patients of deep ulceration with bad granulation tissue, twelve (30.8%) patients had osteomyelitis while 10 (25.6%) patients of gangrenous patches on pressure areas (toe and forefoot). In another local study, common presentations were patients with ulcers 21%, and abscess in 31%, and gangrene in 12.5%.¹⁶

Wagner's classification score may be different for a surgeon as compared to the physician because they come with advanced disease to a surgeon and for this reason patients with grades 3, 4 are more in our study.

The standard treatment for diabetic foot according to Wagner's classification is Prevention for grade-0, Antibiotics, and good glycemic control for grade-1. In grade-2 needs hospital admission, as they need surgical intervention along with antibiotics and glycemic control. Grade-3 requires some sort of amputation, In grade-4 wide debridement and amputation while in grade-5 the preferred treatment is below-knee amputation. In our 56.4 % patients had debridement while 41 % of patients needed amputations, like and another local study 33 % of patients had debridement while 48 % of patients needed amputations.¹⁶

CONCLUSION

Foot ulceration in diabetic patients is a resource-consuming, disabling morbidity that often is the first step towards lower extremity amputation. Prevention is the best treatment.

Grading diabetic foot lesions according to the Wagner classification was simple and easy. It helps in correlating appropriate treatment to the proper grade of the lesion with a better outcome. Plus effective diabetic control and patient education also play a vital role in decreasing diabetic foot disease. With early presentation and hospital admission, aggressive medical and surgical treatment according to the grade of the disease can improve outcome and reduce the morbidity and mortality due to diabetes.

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